

Before the Federal Communications Commission:

In the matter of	(Docket RM-11829
Amending the Amateur Radio Rules to add a	(
Tyro License Class, structuring part of the 70cm band,	(
expanding coordinating committee responsibility,	(
insuring amateur radio as the primary user of 430-440 MHz,	(
adding scientific research to the explicit purpose of	(
amateur radio and requiring governments to allow	(
amateurs reasonable access to government land to build	(
and maintain Amateur Radio Community Service	(
(ARCS) radio systems.	(

Comments of:

Longmont Amateur Radio Club & Down River Control Group

Introduction

0.1 The Longmont Amateur Radio Club (LARC) is an amateur radio service organization open to all licensed Amateur Radio Service Licensees. It is an ARRL affiliated club with nearly two hundred members. While its exact origin is veiled by time, local newspapers reference it back to the 1950s. LARC's goal is to help the local amateur community pursue the "*Basis and purpose*" of the Amateur Radio Service.

0.2 LARK is a force for progress. It is a founding member of Boulder County Amateur Radio Emergency Services (BCARES). BCARES is among the most active and progressive ARES groups in the nation. For many years, LARC has supported a talented tireless selfless team of volunteers recruiting, teaching and testing new amateurs. Every month it educates its members in the radio art. Several times each year, it focuses on *promoting international goodwill* – and, even some local goodwill – with its "field-day" events. It provides the local community with a radio "parade patrol" ready to help as needed. LARC maintains two open amateur FM repeaters (W0ENO 147.270 and 448.800), a club website (www.w0eno.org) and a club bulletin board (www.larcbbbs.org). In short, LARC does what most amateur radio clubs do. And, it does it well.

0.3 But, LARC can do more. Amateur radio can do more. Today, in pursuit of its goal, LARC files these Comments on the ARCS Initiative with the Federal Communications Commission.

0.4 The Down River Control Group (DRCG) is an amateur radio club with roots dating back to 1970. Originally, it was formed by a small group of amateurs in the down-river area of Detroit. Largely, the original group consisted of amateurs professionally involved in two-way radio. Ron Kittel (K8AQC) was the local microwave expert for AT&T; Jack Smith (K8ZOA) was a field engineer for the Federal Communications Commission; Mike Fetcenko (K8ICZ) and Gary Hampton (WB8IIY) were on the technical staff at the Detroit General Electric two-way radio office; Carroll Lysinger (WA8SDC) was a retired marketing and financial entrepreneur.

0.5 The purpose of the DRCG was to help other amateur clubs build radio systems and control electronics for the just burgeoning 2meter and 70cm repeaters. They built the first repeater controllers for the first Detroit repeaters. At that time, there were no commercial amateur repeaters or controllers. The DRCG helped the important progress achieved by a plurality of area clubs. They soldered circuits and climbed tall things, all over Michigan.

0.6 In 2018, the DRCG was reconstituted in respect for the altruism of its founding “silent keys.” Today, the DRCG is licensed as KE0SQU and is a Colorado Public Benefit Corporation. Its small membership consists of radio, computer and business professionals. The mission has not changed. It exists to help amateur radio design, build, control and maintain their shared radio systems... especially altruistic amateur radio clubs.

0.7 The DRCG can do more. Today, it joins LARC in filing these Comments supporting the ARCS Initiative represented in the Commission’s: RM-11829.

The ARCS Initiative Introduction

1.1 LARC and the DRCG have been at the “leading edge” of the Amateur Radio Community Service (ARCS) Initiative. Early on, its members recognized the need for team oriented two-way radio communications among a wide variety of community service groups. There is synergy between that need and the goals of the Amateur Radio Service. Modern culture needs a “wedding.” Community service needs it. Amateur radio needs it. The county sheriff needs it. And FEMA needs it.

1.2 Only amateur radio can realistically do what needs to be done. Yes, the communications needed by community services is permitted on other services. Other service may have enough spectrum to get started on this project; GMRS licensed under Part 95 is one example. Other services may have

technology (and, perhaps the spectrum) that could be modified to solve community service communications needs; examples would be the Business Radio Service (Part 90) and even public safety. Notwithstanding, putting community services on Part 90 and 95 radio service is not the best public policy. We will soon get to our reasons for that statement.

What Community Service Needs

2.1 Our proffer needs answers about community service radio requirements. Many of our members have been addressing such questions throughout our careers but the ARCS Initiative brings community service needs into sharp focus. Community service volunteers have cell-phones now. These work well in urbanized areas when there is no local disaster. Yet, the one-to-one nature of cell service itself has limits. For example, it may be effective to phone your favorite gas-station to see what time they close, but not to phone your whole team to find an open gas-station at this late hour. The difference is how many people are in single conversation. Community service needs radio communications designed for “*team-talk*.” They need to ask all team members beyond ear-shot, *if anybody brought an 18” pipe wrench... or, does anybody have a sterile compress*. Like all team efforts, they need one-to-many communications, *team-talk*. Cell phones cannot do that. Amateur radio can.

2.2 Further, community service teams change. They change fast. Their organization is *ad hoc* in nature. Not only does the immediate team membership dynamically change, the needed structure is often hierarchical. Thirty volunteers arrive with ten boats at a flooded subdivision. They need to split into three person teams searching for victims. Each team needs a channel to coordinate their boat’s activities... but, if they encounter a big problem, they also need a way to contact the larger group. The radio architecture needs to have multiple talk-paths that can be quickly, flexibly and hierarchically programmed under “field conditions.” They need a way to talk in small groups while not interfering with other small groups... all the while, still able to provide appropriate situational awareness to the whole team. Amateur radio can do this.

2.3 Community service volunteers travel to remote locations. They need radios that will work at the destination. If Red Cross volunteers are meeting CERT volunteers to help with a disaster, all their radios need to work together on arrival. It is not enough for the Red Cross radios to work among their people and the CERT radios to work among CERT people. Now, they are a new team... together, an integrated team. All the radios they packed with their work-boots need to work in Florida, Texas,

California, Montana, Maine, Puerto Rico, even Haiti and Mozambique. The radios need nation-wide – preferably world-wide – interoperability. That is only realistic within amateur radio.

2.4 These radios need to provide high quality local coverage, dependable both day and night... and, little affected by weather, electrical noise or ionospheric condition. They should be small reliable, robust, easy to use radios with small antennae and batteries that last all day. All this has never been more achievable. The capacity and low cost of current technology has changed much. The technology allows a new paradigm. Amateur radio can manage that paradigm.

2.5 The systemic performance needs to provide propagation ranges from just a few hundred meters to tens of kilometers. Occasionally, it would be useful to connect remote teams using network connections... connections like the Internet and microwave links. Especially in emergencies, connecting to the Public Switched Telephone Network (PSTN) is useful. Amateur radio does that now. GMRS cannot.

Some reasons for this spectrum

3.1 These are the issues driving the design of ARCS Architecture, including the choice of spectrum. On 70cm today, the basic technology needed to implement such Architecture is available and affordable. Many suppliers are ready. They will act when they believe the market is ready to buy.

3.2 Further, the two slices of spectrum are purposely chosen to use the edges of the internationally allocated portion of our 70cm band. This gives the ARCS Sub-band repeater channels a 9 MHz duplex split. While this is likely to cause some grumbling about “*standardized*” 5 MHz duplex splits, it is a better idea. Not only does this allow effective duplexers and other R. F. filters to be smaller and lower cost, the split avoids interference with international satellite frequencies, an ISM band used in other Regions, some existing single side band and international weak-signal activity, like Earth-Moon-Earth contacts. In short, the 9 MHz split protects an undivided $7\frac{3}{4}$ MHz of spectrum in the middle... together with all the international activity.

Why not Amateur Radio?

4.1 Before returning to other radio services, the most important reason others should not be chosen is amateur radio itself. What it is now. What amateur radio has been since early last century. A careful

look at Part 97.1 proves that non-pecuniary community service needs are fully embraced by the “*Basis and purpose*” of the Amateur Radio Service. Actually, amateur radio is responsible for doing exactly what community service needs. This responsibility is the reason amateur radio is the steward of vast valuable spectrum... free of monetary charge. Our neighbors expect payment another way.

4.2 The major objections to the ARCS Initiative seem the result of distorting the fundamental basis and purpose of this Service. The Commission’s rules say we are charged with: “...*advancing skills in both the communications and technical phases of the art*” and the “*Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.*” These quotes from Part 97.1 evidence the **communication** and **technical** aspects of the radio art are distinct and both valuable. Our goal is to increase them both within the whole of amateur radio by training the skills of each discipline.

4.3 Nothing prevents individual focus on one skill even at the expense of another. Nothing values one aspect over another. Nothing sets an entry skill level for any aspect of the radio art. While it may be true that community service volunteers tend to focus their selfless time learning disaster relief rather than learning the technical aspects of the radio art, they will expand the reservoir of trained operators. They will value that. Amateur radio should value that.

4.4 So, why not let them in? In the past, there was risk to other spectrum users from technically incompetent amateurs. Testing sorts that out. That risk has always been greater on some spectrum and less elsewhere. While that has not changed, the ability of new technology does change the risk balance. The ARCS proposal has chosen spectrum with lower risk and proposes technology requiring very little technical expertise for responsible and safe use. Moreover, ARCS technology will point to bad actors. Amateur radio can let more new recruits in... a lot more.

4.5 The more we let into amateur radio on this controlled basis, the more chance we have to teach some the technical joy of the radio art. If they are not in our “tent,” they may never see this. Yes, the Tyro License can be seen as the participation trophy. But, if they participate they have a chance at bronze, silver or gold. Their participation does not diminish the trophy already won by current amateurs.

4.6 What will happen? Technicians, Generals and Extras will become a much smaller fraction of amateurs. These will become more exclusive. Even more important, ARCS will make amateur radio more visible in our culture. When this is true, your neighbors – the ones trusting you with this spectrum – will recognize your stewardship. They will want amateur radio to continue... to flourish.

4.7 Amateur radio's fidelity to 97.1 is the reason this should be done within Amateur Radio Service and not otherwise. Amateur radio has the existing people infrastructure... teams of people with adequate didactic, technical, managerial, frequency coordination and visionary skills. Amateurs have the right spectrum. They have a good start on installed infrastructure that is lightly used. Hundreds, maybe thousands of amateur radio clubs are "at-the-ready." Each club could do more with more people. Look around at any club meeting, they need to train the next generation to replace them.

Why not other services?

5.1 While it may be lawful to do community service on GMRS, it is not suitable for these reasons: First, GMRS frequencies have usability issues near our borders. It is worse in other countries. This stifles ubiquitous nation-wide interoperability and thwarts it world-wide. Next, GMRS rules (Part 95) do not promote "*advancing skills*" of any kind. Lacking any goal for advancing the radio art, GMRS has not developed the people infrastructure as has amateur radio. That is not to say they could not... but, it is to say: they need not... not unless they want to become "hobby radio" or "ham-fry radio."

5.2 In fact, GMRS is taking on a new look. Richard Dunajewski (N2DLX) now has a GMRS organization with a website at: www.MyGMRS.com. Their website reports about 1500 repeaters, eleven thousand users and 264 repeater networks... all in their fifty state organization. They seem to add about twenty-five new repeaters each week. Their repeaters are given names. One in Rockford Illinois is called Hobby Radio 650. Another group in Chicago is called: Northern State Emergency Association. Two others are: Susquehanna Valley Rescue and Reading Search And Rescue. A Colorado group called Front Range GMRS has a newsletter quick to point out that the whole family can use a single license. Like MyGMRS and Front Range GMRS, most of the leadership in these groups are amateur radio operators.

5.3 What does this mean? Why did these amateurs start two-way radio interest groups in a radio service other than amateur radio? It cannot be because GMRS has more trained mentors than amateur radio. Amateur radio has thousands ready to mentor these new users toward becoming better

communicators and technicians. It cannot be because they needed more capacity or better coverage than amateur repeaters offer. GMRS is building many new repeaters in the same building with existing almost unused amateur repeaters on virtually identical spectrum. It cannot be because they want better network performance from interconnected repeaters that amateur radio offers. While GMRS is building Internet connected networks of repeaters they suffer substantial limitations compared to amateur radio. Without a change in the rules, they will never be able to approach the networking features available with amateur radio. And still they come.

5.4 GMRS clearly does not have the technical or people infrastructure comparable to amateur radio. They must borrow it from amateur radio. Nor do their rules (Part 95) promote *advancing the radio art* among their users. Moreover, their spectrum is limited. If fifteen million community service volunteers attempt using their eight channels to provide their discovered communication needs, antiquated GMRS technology and spectrum would soon disappoint them. GMRS would be back to the Commission asking for help. Then, the farmers and other family business people needing a ***for-profit repeater*** would have reason to complain.

5.5 About a decade ago, the Commission began revising the GMRS rules as part of their re-farming process. In the end, the Commission relented and let GMRS keep their superannuated wide-band repeater channels. From the view of family business and small farm users, the Commission's almost unique GMRS action was a reasonable compromise.

5.6 Yet, hobby radio and community service have discovered GMRS. No license test there. They focus on their peculiar communications... and, hams help them with the technical issues. This may not end well. If it is a hobby, the family business people will resent a profit perturbing crowd. If it is community service, the "ham-fry" vision is too small. The Tyro License head this in a better direction.

5.7 With the exception of public safety, Part 90 services have no didactic component teaching communication and technical skills. The business and industrial pool is unlikely to have an adequate slice of nation-wide spectrum. Nor should they. Here again, the business and industrial services are for ventures needing spectrum providing local for-profit communications. There is virtually no hope for nation-wide interoperability and none at all for world-wide interoperability.

5.8 Public safety could almost provide what community services needs... but, should they. In the past, public safety has said no, many times in many ways. We join them. They too offer little hope for nation-wide interoperability and none for world-wide compatibility. Further, public safety has their own urgent priorities. It seems foolish to divert their resources when amateur radio is charged with this responsibility... and, amateur radio is equipped to do it. As it has historically been, public safety and amateur radio are still partners. Predictably, public safety will support the ARCS Initiative when it joins the existing ARES team.

The ARCS Initiative Vision

6.1 Amateur radio can build a nation-wide intuitively interoperable two-way radio infrastructure available for all non-pecuniary one-to-many communications generated by community service volunteers while helping to manage evacuations, rescue and rebuilding. This ARCS infrastructure can even be used for non-profit recreational communication for large segments of the amateur community. Such quotidian use makes the infrastructure valuable even when conditions are not exigent. This is a good time and a good place to train new amateur recruits and other community service volunteers.

6.2 With modern “smart-radios,” these volunteers can become trained communications experts without needing to also be excessively qualified in radio technology before entry. Unlike past technology, smart-radios cannot be moved to unauthorized frequencies. Such radios are much less susceptible to unwanted emissions. In fact, modern smart-radios can even avoid careless interference.

6.3 The radio band selected by the ARCS Initiative avoids ionospheric propagation modes that might interfere with communications far beyond the horizon. When mistakes and misconduct do happen, the effect is limited to the local area by the laws of physics. The need to program the licensees call-sign into smart-radios before the radio can transmit, coupled with its automatic digital identification, will discourage mischief.

6.4 The channelization suggested by the Initiative allows elegant radio design incorporating digital *ad hoc trunking* and *digital collection* of users into selected groups. Such *ad hoc trunking* with its *digital collection* allows a better way of sharing spectrum. Instead of assigning a channel to a group, a *digital collection* number is assigned. This way, any repeater (any channel) able to cover the needed geography can be used. This design allows several repeaters to be managed as a “*trunking-group*.” Then, when all repeaters are busy except one, the system still seems empty to the next user. When compared to the reserved channel coordination now used by amateur radio, a simple Erlang analysis

will show the busy-hour traffic capacity is easily tripled. Further, the scheme also offers cost sharing benefits for cooperating amateur radio clubs.

6.5 State coordinating committees can strategically locate the seventy repeater channels into trunking groups that can be transparently shared among many groups with diverse missions. To the users, it will seem as if they have their own channel... a channel always ready for their use. This allows for “CQ” type digital collection for persons just wanting to make a contact... a scout troop digital collection for scouts talking to each other... a Habitat for Humanity digital collection for volunteers building homes to “give” away. Users are not aware of the sharing. Most importantly, emergency (MAYDAY) and urgent (PAN) type calls can be isolated and prioritized. The ARCS Initiative with its proposed technology would allow public safety centers to monitor ARCS systems and only hear the priority calls of their choosing. Actually, all users choose what they hear; however, MAYDAY calls are the exception everybody hears.

6.6 The *ad hoc trunking* and *digital group collection* technology, including frequency allocation, would be standardized for uniform interoperability nation-wide (even world-wide on these frequencies). Further, the spectrum capacity tripling offered by *ad hoc trunking* is doubled again by the Initiative’s narrow-banding. This rule change allows – and even encourages – amateur radio to begin moving to these more spectrum efficient technologies. In other words, “re-farming” our 70cm band. The proposed 2 ¼ MHz wide ARCS Sub-band could carry 130% of the potential traffic of the entire 10 MHz from 440-450 MHz as it is used today. That estimate does not include the additional vast information increase possible using the digital mode ARCS promotes.

6.7 The Tyro license coupled with *smart-radio*, *ad hoc trunking* and *digital collection* technology poses virtually no risk to current users, spectrum management or code enforcement. Due to the prevalence of frequency agile radios among the thinly installed base, very few current users of this spectrum will suffer painful disruption. The state coordinating committees will be well able to manage the inevitable migration of existing systems to and from this spectrum. Because of the current “thin use,” the Commission could allow several years for completion. Over time, many FM repeaters now occupying 440-450 MHz will move to this ARCS Sub-band; thus, reducing the future interference potential with current primary users (e.g., wind profiling radar) that are likely to become much more common. Wind profiling radar is most likely to increase deployment in tornado and hurricane zones. This would cause conflict on just the spectrum commonly occupied by amateur 70cm repeaters.

Without ARCS, perhaps, some of these repeaters will be the very ones ARES will need most desperately, as the radar delivers bad news.

6.8 The Rendezvous Channel is important to the success of this re-farming technology. The Commission needs to set aside the 439.5000/430.5000 MHz pair for ARCS Sub-band control signals.

6.9 The ARCS Initiative allows amateur radio to incorporate responsible community service volunteers into a subculture able to connect and coordinate otherwise disparate groups in times of crisis. Their common bonds will be the charity they brought to amateur radio and communication skills amateur radio helped them add.

6.10 The Tyro License coupled with ARCS Architecture will allow amateur radio to recruit youth at a unique developmental age – with little risk. This gets them interested with a successful start in the radio art. Even if it takes half their lifetime for this seed to flower, the investment and risks are low.

6.11 The DRCG has already started design on *ARCS Architecture*. This includes: *smart-radio* control, *ad hoc trunking* control, *digital collection*, and digital identity transmission. Our purpose is to develop documentation, reference designs and working prototypes for *ARCS Architecture*. As this is developed, we will release it to amateur radio for their use as open architecture... meaning: no secrets, no royalties, any manufacturer can use it; it must just adhere to the standards set by a National Committee... which is jointly established by amateur radio and the Commission. The DRCG will relinquish further development to this Committee. Others are free to develop proposals for this architecture too. In the end, the Committee will decide among the open architecture and establish the standards.

6.12 Even if the DRCG should fail in its attempt to deliver working ARCS Architecture design, adopting rules supporting this Initiative will be an overwhelming market force driving some compatible open architecture to fruition.

6.13 Such Commission action will remove the largest remaining risks. Amateur radio already has the people infrastructure. Government controlled highway medians and mountain tops are there. Albeit misguided, recent developments on GMRS show a real interest in *advancing the radio art* with their community service communication and even hobby radio that includes simple “chat room” social

interchange. Amateurs and *ham-frys* alike, are spending time and money on it now. Amateur radio and now GMRS has already invested vast sums of private money in repeaters and networks. If the Commission forces government to give amateurs reasonable access to public land, licenses eager new communication oriented recruits, empowers amateur committees to manage the Initiative as well as structuring this small piece of spectrum as suggested, the result will be the model for community service two-way radio. The equipment suppliers will notice. The public will notice. The world will notice.

6.14 It is our sincere hope the Commission will change the rules as suggested in the Tyro Petition as amended by the ARCS Initiative. Our clubs have been successful pursuing the radio arts. But we can do more.

Respectfully submitted on behalf of the
Down River Control Group
by its President:

Paul I. Hampton,
W0PIH, PG1816594

Respectfully submitted on behalf of the
Longmont Amateur Radio Club
by its President:

Starr E. Aldrich Jr.
N0AES